

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 61.81204/001	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/GB2004/002706	International filing date (day/month/year) 24/06/2004	(Earliest) Priority Date (day/month/year) 24/06/2003
Applicant  ISIS INNOVATION LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box II).

3. ☒ Unity of invention is lacking (see Box III).

**4. With regard to the title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. With regard to the drawings,**

- a. the figure of the drawings to be published with the abstract is Figure No. \_\_\_\_\_

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB2004/002706A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C07H5/10 C12N9/56 C12N9/44

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 C07H C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BEILSTEIN Data, WPI Data, CHEM ABS Data, BIOSIS

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE CAPLUS CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; XP002300619 retrieved from STN	1-3, 5, 7, 15, 16
Y	Database accession no. AN: 1955:53561 DN:49:53561, OREF:49:103061, 10307a-e abstract  & YAMADA ET AL.: "Synthesis of thiamine alkyl disulfides" YAKUGAKU ZASSHI, no. 74, 1954, pages 963-966, ----- -/--	1-5, 7-9, 11-13, 15-17

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

20 May 2005

Date of mailing of the international search report

13. 06. 2005

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FIELD ET AL.: "Biologically orientated..." J.ORG.CHEM., vol. 36, no. 2, 1971, pages 309-313, XP002300617	1-3,7, 15,16
Y	page 309	1-5,7-9, 11-13, 15-17
X	----- RAJCA A ET AL: "NEW MIXED DISULFIDES OF L-CYSTEINE DERIVATIVES AND OF GLUTATHIONE WITH DIETHYLDITHIOCARBAMIC ACID AND 2-MERCAPTOETHANESULFONIC ACID" ARZNEIMITTEL FORSCHUNG. DRUG RESEARCH, EDITIO CANTOR. AULENDORF, DE, vol. 40, no. 3, 1990, pages 282-286, XP000882932 ISSN: 0004-4172	1,5,7,15
Y	page 284	1-5,7-9, 11-13, 15-17
X	----- RAJCA A ET AL: "SYNTHESIS OF UNSYMMETRICAL DISULFIDES WITH THIOLSULFONATES IMMOBILISED ON A POLYSTYRENE SUPPORT" TETRAHEDRON LETTERS, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 31, no. 42, 1990, pages 6075-6076, XP000653113 ISSN: 0040-4039	1-3,7, 15,16
Y	the whole document	1-5,7-9, 11-13, 15-17
Y	----- WO 00/01712 A (GENENCOR INT) 13 January 2000 (2000-01-13)  page 6	1-5,7-9, 11-13, 15-17
X	----- JOHNSTON B D ET AL: "Synthesis of thio-linked disaccharides by 1-->2 intramolecular thioglycosyl migration: oxacarbenium versus episulfonium ion intermediates." THE JOURNAL OF ORGANIC CHEMISTRY. 28 JUL 2000, vol. 65, no. 15, 28 July 2000 (2000-07-28), pages 4607-4617, XP002328859 ISSN: 0022-3263 page 4611; compound 34  ----- -/--	8-10

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	REICH H J ET AL: "ORGANOSELENIUM CHEMISTRY ALKYLATION OF ACID ESTER AMIDE AND KETONE ENOLATES WITH BROMOMETHYL BENZYL SELENIDE AND SULFIDE PREPARATION OF SELENOCYSTEINE DERIVATIVES" JOURNAL OF ORGANIC CHEMISTRY, vol. 51, no. 15, 1986, pages 2981-2988, XP002328860 ISSN: 0022-3263 p. 5551, scheme II	1, 6, 15
P, X	GAMBLIN DAVID P ET AL: "Glycosyl phenylthiosulfonates (glyco-PTS): novel reagents for glycoprotein synthesis." ORGANIC & BIOMOLECULAR CHEMISTRY. 7 NOV 2003, vol. 1, no. 21, 7 November 2003 (2003-11-07), pages 3642-3644, XP002300618 ISSN: 1477-0520 the whole document	1-5, 7-9, 11-13, 15-17
P, X	GAMBLIN DAVID P ET AL: "Glyco-SeS: selenenylsulfide-mediated protein glycoconjugation--a new strategy in post-translational modification." ANGEWANDTE CHEMIE (INTERNATIONAL ED. IN ENGLISH) 6 FEB 2004, vol. 43, no. 7, 6 February 2004 (2004-02-06), pages 828-833, XP002328861 ISSN: 0570-0833 the whole document	1-6, 8-10, 14-29

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2004/002706

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5(part),7,8-9(part),11,12,13,15-17(part)

methods and reagents involving thiosulfonates  
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2. claims: 1-5(part),6,8-9(part),10,14,15-17(part),18-29

methods and reagents involving selenylsulfides  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/GB2004/002706

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0001712	A	13-01-2000	
		AU 749383 B2	27-06-2002
		AU 5208199 A	24-01-2000
		CA 2331783 A1	13-01-2000
		EP 1093459 A2	25-04-2001
		JP 2002519050 T	02-07-2002
		US 2002146803 A1	10-10-2002
		WO 0001712 A2	13-01-2000
		US 2001018200 A1	30-08-2001